

EARTH SCIENCE (ERTH)

ERTH 6400 International Field Camp (formerly GEOL 6400)

3 credit hours

This course is offered on an irregular basis in the form of a Geology field trip abroad, allowing the students to be exposed to geological features that cannot be found in Canada. In practical terms, this course will acquaint the student with modern methods of structural, stratigraphic, petrologic and/or geophysical analysis. After mastering these skills, students will undertake an independent geological report project. Students may be required to travel at their own expense.

ERTH 6414 Tectonics (formerly GEOL 6414)

3 credit hours

This course describes the major features of the Earth and its place in the solar system. The evidence for plate tectonics, the analysis of plate movements, and the characteristic rock associations formed in different tectonic environments are presented. Aspects of global change will be considered, including the evolution of tectonic processes through geologic time, changes in the atmosphere and oceans, and the importance of meteorite impacts.

ERTH 6441 Mineral Resources (formerly GEOL 6441)

3 credit hours

A study of Earth's mineral resources, their classification, genesis and distribution in time and space. Important examples from Canada and abroad will be discussed. Topics will also include mineral exploration techniques, mining methods, metallurgical recovery, net smelter return, and ore reserve estimation/classification. Laboratories will examine a variety of base and precious metal ore deposit types. Mining/exploration practice and resource exploitation are also examined in terms of their environmental impacts.

ERTH 6450 Advanced Igneous and Metamorphic Petrology (formerly GEOL 6450)

3 credit hours

The topics covered in this course include magmatic petrogenesis; magma types; petrographic provinces and their relations to their tectonic setting; differentiation indices; variation diagrams; distribution trends of major and trace elements; equilibrium and fractional crystallization in selected synthetic systems; phase equilibria in metamorphic systems; reaction balancing methods; porphyroblast-matrix relations; quantification of pressure-temperature-time trajectories. Laboratory work is centered on the acquisition and manipulation of microprobe data.

ERTH 6465 Advanced Sedimentology (formerly GEOL 6465)

3 credit hours

This course examines current research on sedimentary rocks and basins and the methods used to understand them. The course is taught as a series of modules by multiple instructors who introduce the students to selected areas of research. Among the topics to be covered are modern carbonate and evaporite environments, exotic chemical sedimentary rocks and diagenetic cements, volcanogenic sedimentary rocks, sequence stratigraphy in carbonate and siliciclastic successions, applications of ichnology (trace fossils), the use of stable isotopes in the study of terrestrial carbonates, and the use of detrital minerals to interpret basin evolution.

ERTH 6630 Directed Study in Earth Science (formerly GEOL 6630)

3 credit hours

Intended to supplement or provide an alternative to the regular geology courses in order to meet the special needs and interests of students. The course provides an opportunity to study a particular subject in detail and requires from the student some measure of independence and initiative.

ERTH 6641 Mineral Resources (formerly GEOL 6641)

3 credit hours

A study of Earth's mineral resources, particularly metallic and some non-metallic mineral deposits, their classification, genesis and distribution in time and space. Important examples from Canada and abroad will be discussed. Topics will also include mineral exploration, mining, and the environmental impact of resource exploitation.

ERTH 6642 Economic Mineral Deposits (formerly GEOL 6642)

3 credit hours

The course examines the geology, mineralogy, economic geology and origin of major types of metallic and some non-metallic deposits in Canada and elsewhere. Laboratory includes investigation of suites of samples from the deposits.

ERTH 6654 Applied Geochemistry (formerly GEOL 6654)

3 credit hours

The application of graphical and numerical tools for classifying Earth materials according to their chemical composition is studied through field-based and computer-based laboratories. This course examines geochemical sampling, instrumental analysis, statistical evaluation of real geochemical data, and the methods of proper reporting and quality control. The students are introduced to novel methods (fluid inclusion microanalysis, alteration mapping in ore deposits, reaction path modeling) and their application in characterizing geochemical processes on Earth.

ERTH 6666 Petroleum Geology (formerly GEOL 6666)

3 credit hours

The origin, migration and accumulation of oil and natural gas. Types of oil bearing structures and basic principles in oil exploration.

ERTH 6678 Directed Study in Earth Science (formerly GEOL 6678)

3 credit hours

ERTH 6690 - 6699 Directed Studies in Earth Science

3 credit hours

Intended to supplement or provide an alternative to the regular geology courses in order to meet the special needs and interests of students. The course provides an opportunity to study a particular subject in detail and requires from the student some measure of independence and initiative.

ERTH 6800 – 6825 Special Topics in Earth Science

6 credit hours

Course content varies from year to year.

ERTH 6826 – 6849 Special Topics in Earth Science

3 credit hours

Course content varies from year to year.